



IBM

**Installation Manual – Physical Planning
IBM Input-Output Components,
7000 Series and 1410 Data Processing Systems**

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Installation Manual — Physical Planning
IBM Input-Output Components,
7000 Series and 1410 Data Processing Systems

PREFACE

This manual contains information necessary for planning the physical installation of Input-Output Components on the IBM 1410 Data Processing System or any IBM 7000 Series System.

In addition to technical information needed for physical installation planning, it contains recommendations and suggestions to be used as a guide only in planning an efficient and pleasant installation. The customer should make such arrangements as he deems necessary for professional consultants' services in planning his installation. It is important that local and national code requirements be adhered to by the customer.

The requirements of the system are subject to modification by engineering developments.

This manual obsoletes the following Physical Planning Bulletins: Tape Switching Feature for IBM 729II and 729IV Magnetic Tape Units, Form J22-6S92; 7340 Hypertape Drive for IBM 7000 Series Systems, Form J22-6615; 1301 Disk Storage for IBM 7000 Series Systems, Form J22-6600-1.

Address comments concerning this manual to:

IBM Corporation, Customer Manuals, Dept. 298, P.O. Box 390, Poughkeepsie, New York

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IBM INPUT-OUTPUT COMPONENTS INSTALLATION MANUAL - PHYSICAL PLANNING

This manual contains the information necessary to install input-output components on IBM 1410 or 7000 series systems. It should be used to supplement the system installation manual.

Where specifications of temperature, humidity or power for a component and a system conflict, the more critical figures are to be used for the installation.

The specifications contained are summarized by system. In some cases data for the same unit differs for the various systems. Only the data concerning your particular system should be used.

Cables for the components listed will be supplied according to the cable policy stated in the system Physical Installation Planning Manual.

SCHEDULE

Because each data processing machine installation will differ in some respects from every other installation, it is not possible to provide a detailed schedule in a manual such as this. However, the following suggested schedule should be adhered to as closely as possible:

Twelve Months before Machine Delivery

1. Determine the machine components desired and review the order.
2. Read this Physical Planning Installation Manual and the system Physical Planning Installation Manual.
3. Determine the prospective location of the system. Make a preliminary layout of the proposed installation.
4. Request a visit by the IBM Regional Physical Planning representative to discuss with the customer's personnel (including the planning staff and consulting group) installation, power, and air conditioning requirements. At this meeting, the proposed room layout will be discussed. Floor construction and the placement of raceways and power receptacles will also be discussed.
5. Advise IBM of security or other restrictions, and advise of any unusual housing requirements as a result of these restrictions.
6. The customer should study local delivery quotations on power and air conditioning equipment to determine when this equipment must be ordered.

Six Months before Machine Delivery

The air conditioning equipment should be reviewed.

Four Months before Machine Delivery

The final layout should be made and approved by the customer, Branch Manager and Customer Engineering Manager so that all cables can be ordered. The cable order should be made up at the branch office from the final layout and forwarded by the Branch Manager to the Order Department of the plant of control. When the customer and the branch office require assistance, the Regional Physical Planning representative should be contacted. THIS IS A CRITICAL POINT IN THE SCHEDULE. After these cables are ordered, no changes should be made in the layout that will affect cable lengths.

One Month before Machine Delivery

A survey must be made by local IBM representatives to determine specific requirements for moving the machine components from the delivery platform to the machine room. This information should be forwarded directly to the IBM Traffic Department at Poughkeepsie.

Two Weeks before System Delivery

1. Cables will be delivered to the machine room for installation by the customer under the supervision of the IBM Customer Engineers.
2. Customer Engineering furniture and equipment will be delivered.

Components not shipped with the system will have their cables shipped with the individually delivered units.

One Week before Machine Delivery

ALL AIR CONDITIONING EQUIPMENT SHOULD BE INSTALLED, TESTED, AND READY FOR OPERATION. Electrical facilities, lighting, floor ramps, painting, plastering, and decorating should also be completed at this time.

Every effort should be made to balance the air conditioning system as soon as possible after the machine has been delivered.

UNIT DESCRIPTIONS

IBM 7904 Data Channel: A unit containing controls to synchronize the transfer of data from input-output components to the 7040 or 7044 system.

IBM 7907 Data Channel: A unit containing the necessary controls to synchronize the transfer of data from the input-output components to the 7070 or 7074 system.

IBM 7908 Data Channel: A unit containing the necessary controls to synchronize the transfer of data from the input-output components to the 7080 system.

IBM 7909 Data Channel: A unit containing the necessary controls to synchronize the transfer of data from the input-output components to the 7090 system.

IBM 7631 File Control: A unit containing the necessary control circuits for the file units.

IBM 1301 Disk Storage: A high density, large capacity, random access storage unit.

IBM 7155 Switch Control Console: A small unit to permit manual control of tape unit assignment from the system console.

IBM 7640 Hypertape Control: A unit containing the necessary circuits for synchronization and data transfer. Operates in conjunction with the system data channel.

IBM 7340 Hypertape Drive: Magnetic tape input-output unit using one-inch tape and cartridge loading.

IBM 1009 Data Transmission Unit: A unit permitting data transmission over common carrier lines to a computer.

IBM 1011 Paper Tape Reader: A unit that reads punched paper tape for data input to a system.

IBM 1014 Inquiry Unit: A unit that permits inquiry into a computer system from a remote location.

IBM 1414-5,6 Input-Output Synchronizer: A unit that permits the attachment of communications and paper tape equipment to a system.

SPECIAL INSTALLATION CONSIDERATIONS

Itemized below by machine type are the various special points to be considered in determining the physical location of the equipment covered by this manual.

IBM 7907 Data Channel: The upper half of the front of this unit should be visible from the console. It contains a function display panel which is useful to the operator and Customer Engineer.

IBM 7631 File Control: This unit contains an operator panel which should be visible from the front of the system data channel or channels (7907, 7908, or 7909; any one or a combination of two) and the system console.

IBM 7640 Hypertape Control: This unit contains an operator panel which should be visible from the front of the system data channel or channels (7907, 7908, or 7909) and the system console.

IBM 7340 Hypertape Drive: Space between these units should be 7 inches, 22 inches, 7 inches, 22 inches. The end drive of a group of four requires a source of power.

IBM 1009 Data Transmission Unit: This unit should be located adjacent to the system console. Specify same voltage as for the using system when it is installed in the computer room.

IBM 1014 Inquiry Unit: Specify same voltage as for the using system when this unit is installed in the computer room.

IBM 1414-5,6 Input-Output Synchronizer: To facilitate servicing, locate this unit to permit reasonably good visual access to common carrier line terminals.

The following paragraphs describe additional points to be considered:

The service clearance for any unit should not overlap the service clearance of its control unit or synchronizer.

The 1301 Disk Storage is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.

Allow space in the computer area for the common carrier equipment when communications type equipment is to be installed. This space should be within sight of the using equipment to facilitate servicing. The amount of space required should be determined by the equipment supplier.

If a raised floor is not used, cable must enter and leave any 7631, 7640, 1414 or similarly constructed unit through the end covers. Special end covers are provided to permit this. The total area available for the passage of external cables within these units is limited to 25 square inches. This restriction should be considered when making system layouts.

Customer Engineering Servicing Considerations

The following features are highly desirable in all layouts and should be incorporated if at all possible without sacrificing the system's operating features.

1. There should be visual access between a control unit or synchronizer and one of each type of its attachable units.

2. There should be visual access between a data channel and each of its attached control units or synchronizers.

TAPE SWITCHING FEATURE FOR IBM 729 II, IV, V, AND VI MAGNETIC TAPE UNITS

IBM 729 II, IV, V, and VI Magnetic Tape Units may be modified to permit signal cable switching between two magnetic tape channels under control of the IBM 7155 Switch Control Console (Figure 1). Power to the modified tape units is not switched between channels. It may be supplied from either channel. However, the power cables must be manually changed to obtain this condition.

The modified tape units provide two additional signal cable connectors (Figure 2), the switching relays, the control cable connector for the Switch Control Console, and fifty feet of control cable.

The 7155 Switch Control Console contains the remote control switches and a plug for connecting to the fifty feet of control cable for each tape unit to be controlled.

The console may be placed on the system console or in any other location which can be reached with the fifty feet of control cable.

Any number of tape units may be modified for tape switching. Up to eight modified tape units may be controlled by one control console. The number of tape units per channel and the maximum length of cables (signal and power) specified for a given tape channel are the only limiting factors. The total length of signal and power cable between the tape



Figure 1. IBM 7155 Switch Control Console

channel and the last tape unit on line must not exceed the maximum specified for the system. This includes all tape units connected to this tape channel whether the tape units are switched to this tape channel or not.

The installation requirements of a modified tape unit are the same as for a standard 729 II, IV, V, or VI, except for the connecting cables.

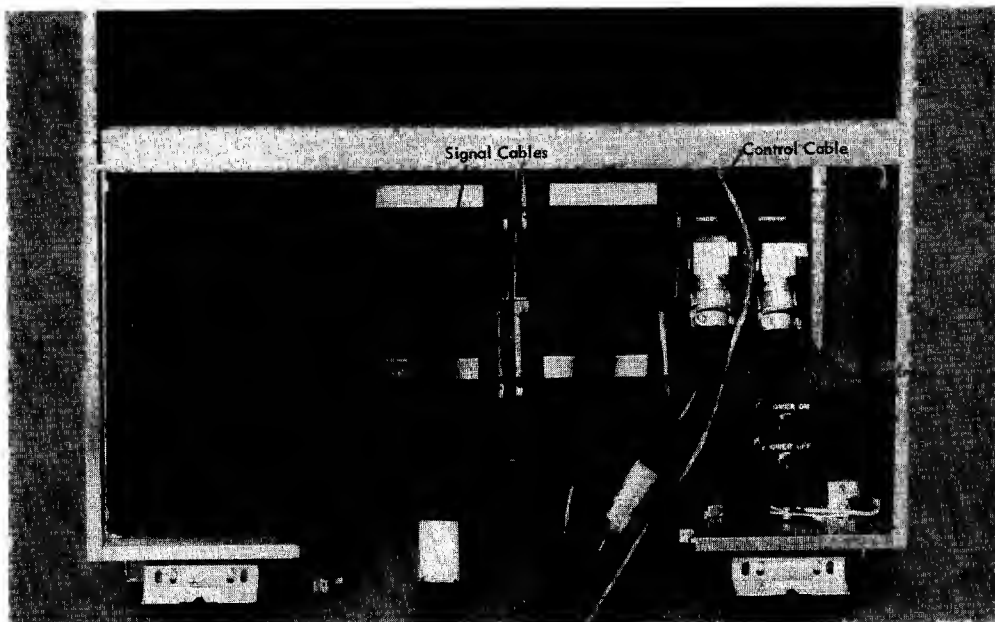


Figure 2. Tape Unit Cables & Connectors

The key number for the signal cables between modified tape units will depend on the systems involved and whether the cables are routed under the floor. The key number for the standard tape-to-tape signal cable, part number 535099, should be used between modified units where the cables are routed under the floor.

A new cable key number 300 for tape-to-tape signal cable, part number 352793, should be used between modified units where the cables are routed on top of the floor. This cable has one connector with a 45-degree cable exit to mate with the lower signal cable receptacle on the modified unit.

If tape units are to be field-modified and the cables are routed on top of the floor, the above cable must be ordered to replace those cables which will require the connectors with the 45-degree angle cable exit. The cables should be ordered on the original order or on an Installation-Alteration-Correction Notice.

The tape-to-tape signal cables between modified units should be written in on the system's cable order form and sent to the plant of control.

The key number for the power cable between modified tape units will depend on the systems involved. However, 18 inches should be added to the X dimension of the power cables between the modified units to take care of the relocation of the power cable connectors as shown in Figure 3.

CAUTION: The total length of power and signal cable between the control unit and the last tape unit on a line must not exceed the maximum cable length as specified in the physical planning installation manual for that system. The tape units with the

signal cable terminators must have power on them for the tape units to operate.

Examples of Tape Switching

The following examples describe the cabling technique when tape switching is employed.

All cable lengths are measured based on running length between units from the point of entry and exit of the units at floor height, with all units installed on a 12-inch raised floor.

All examples are for a 7090 system. The maximum signal cable length, per signal cable group, is 60 feet.

Figure 4 illustrates a two-channel 7090 system with nine tape units per channel. Signal group A is 50 feet, group B 47 feet, group C 42-1/2 feet and group D 45 feet.

Figure 5 is the same physical layout as Figure 4. However, tape switching has been installed on tape unit B1X and C9X. It now becomes possible to switch a tape unit between channels so that one or the other tape channel may have either eight, nine, or ten tape units.

Tape signal cable groups A and D are not affected; therefore, signal cable length remains as before. Signal cable group B has been increased to 57 feet and group C to 52-1/2 feet.

To determine this cable length, the total cable length must be considered, regardless of whether the tape unit is switched on or off the channel. It is the total signal cable footage the Tape Adapter Unit

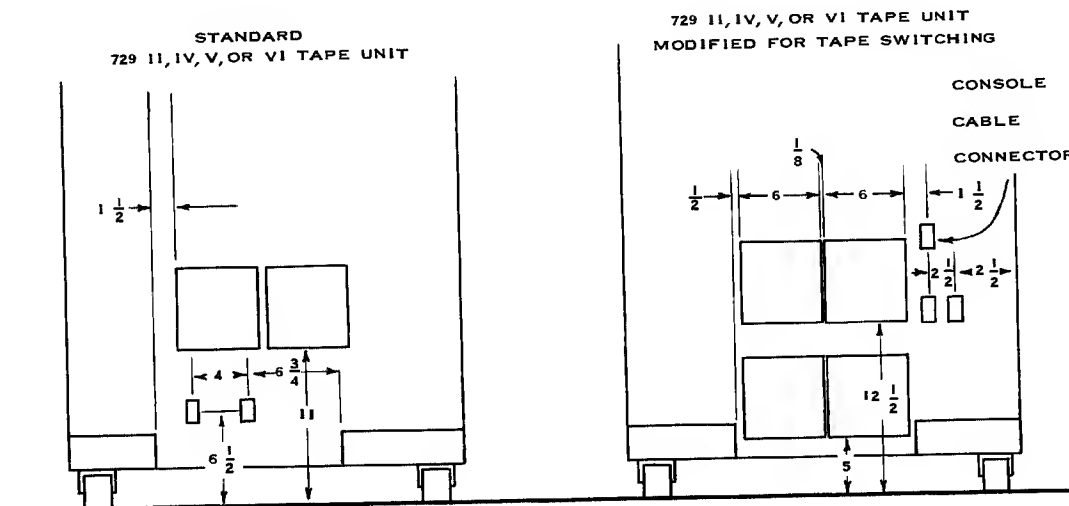


Figure 3. Connector Location Differences

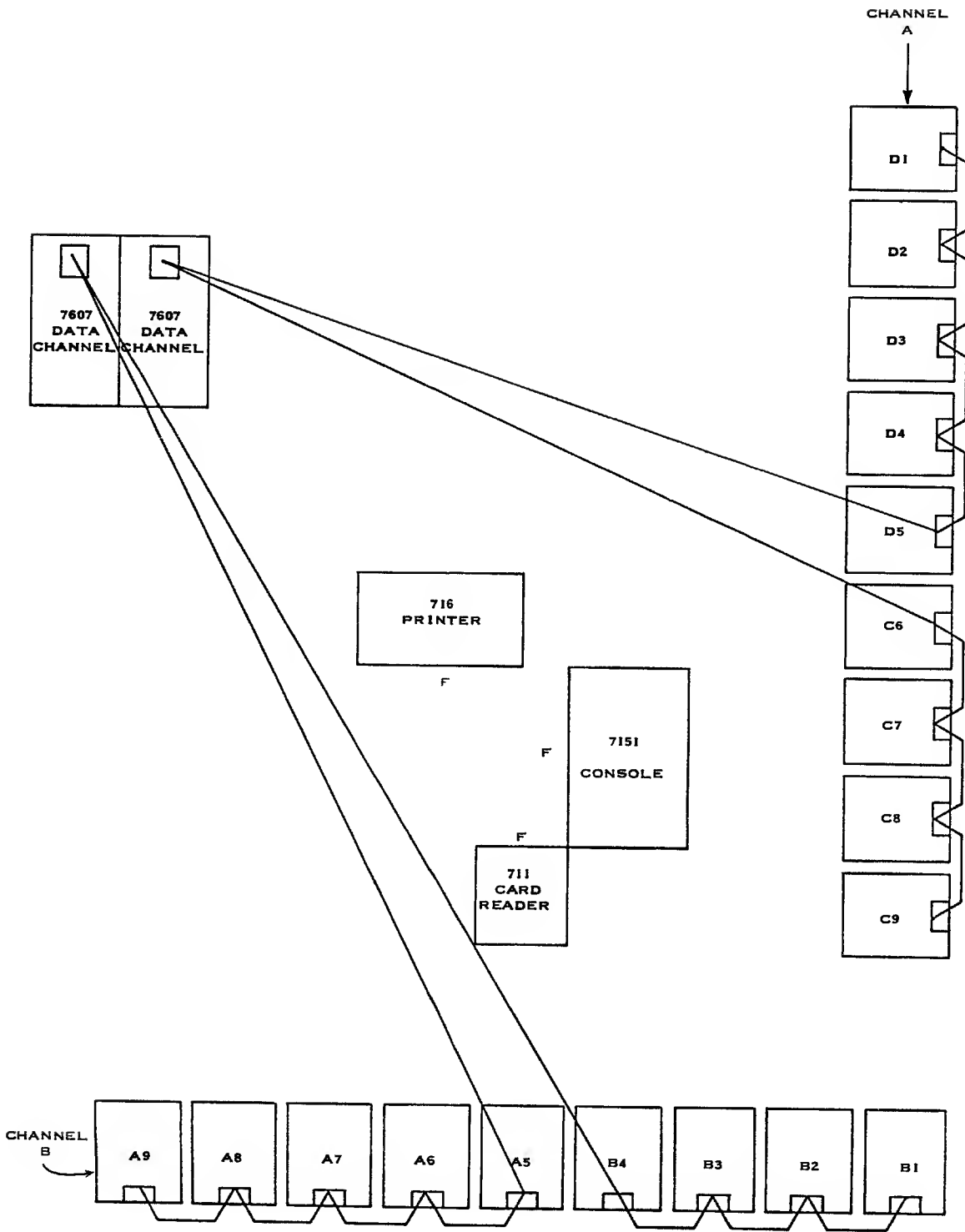


Figure 4. Tape Unit Cabling without Tape Switching

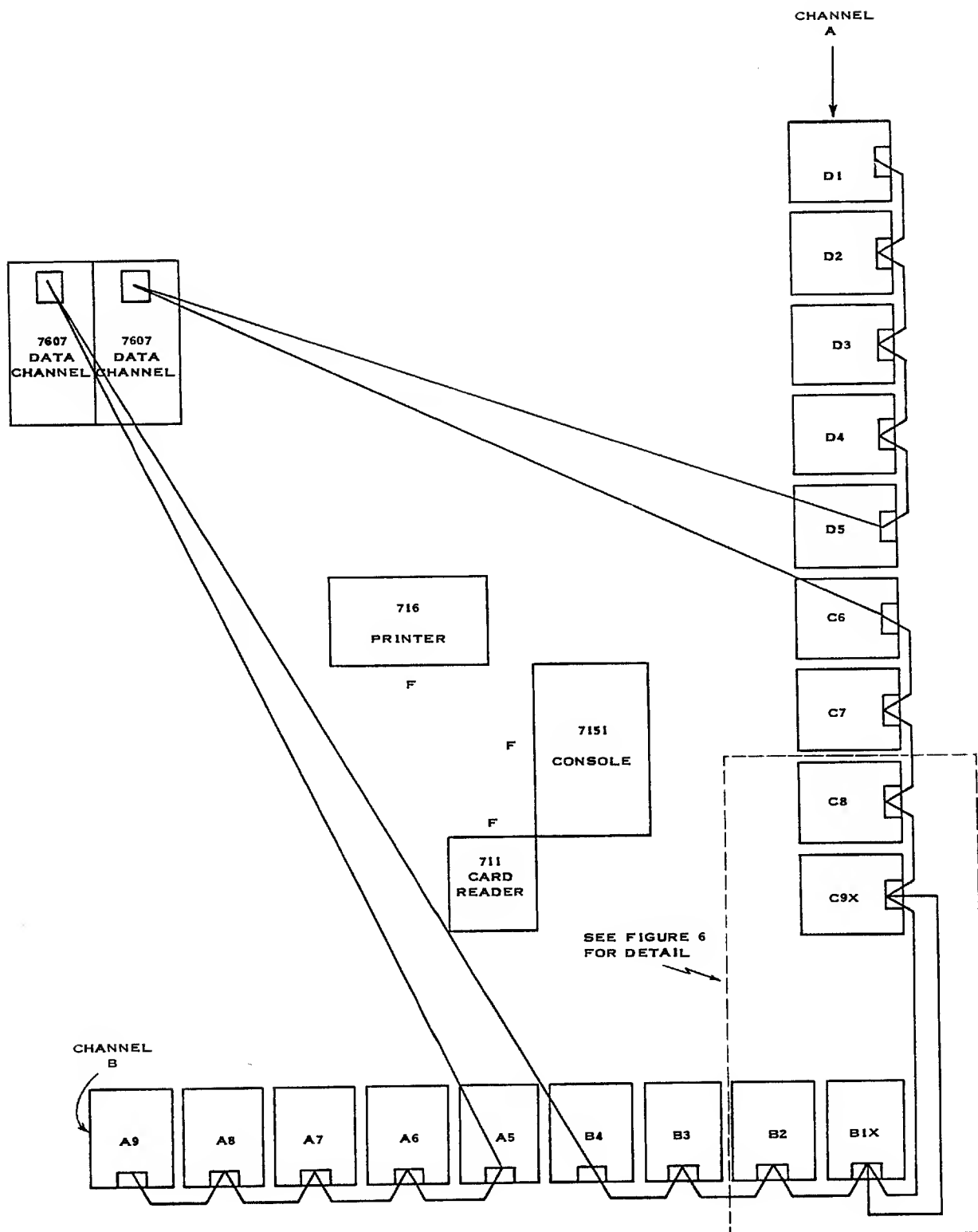


Figure 5. Tape Unit Cabling with Tape Switching

(TAU) must "look at." For group B, the TAU looks at the cable from the 7607 to tapes B4, B3, B2, B1X, and 9X, a total of 57 feet. For group C, the TAU looks at the cable from the 7607 to tapes C6, C7, C8, C9X, and B1X, a total of 52-1/2 feet.

Note that tape unit C9X now becomes the last tape unit in the B signal group, while tape unit B1X becomes the last tape unit in the C signal group. As these units are the last of each signal group, they must have a signal line terminator installed. Figure 6 provides a detail of the actual cabling and termination for these tape units.

Figure 7 is the same physical layout as Figures 4 and 5, but now an IBM 1401 System has been included. By installing the tape switching feature on tape units A9X and D1X, it now becomes possible to switch a tape from either tape channel of the 7090 to the tape channel of the 1401.

Tape signal cable groups A, B, C, and D are not affected and their signal cable lengths remain the same as previously described under Figure 5. Signal cable group E refers to the 1401. The signal cable length for E is: 15-1/2 feet from the 1401 to tape unit D1X, plus 38 feet from tape unit D1X to tape unit A9X, or a total signal cable length of 53-1/2 feet.

In this particular example, tape unit A9X would have two signal terminators installed in the two lower signal cable receptacles, one terminator for signal group A and another for signal group E.

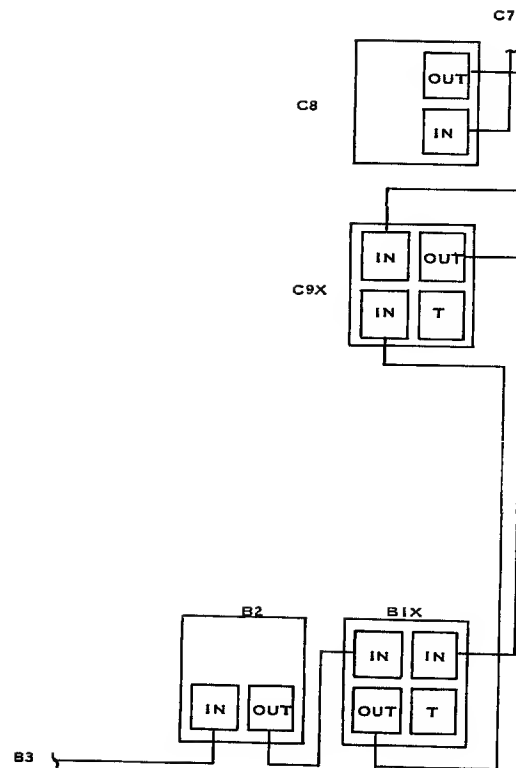


Figure 6. Tape Unit Cable Termination

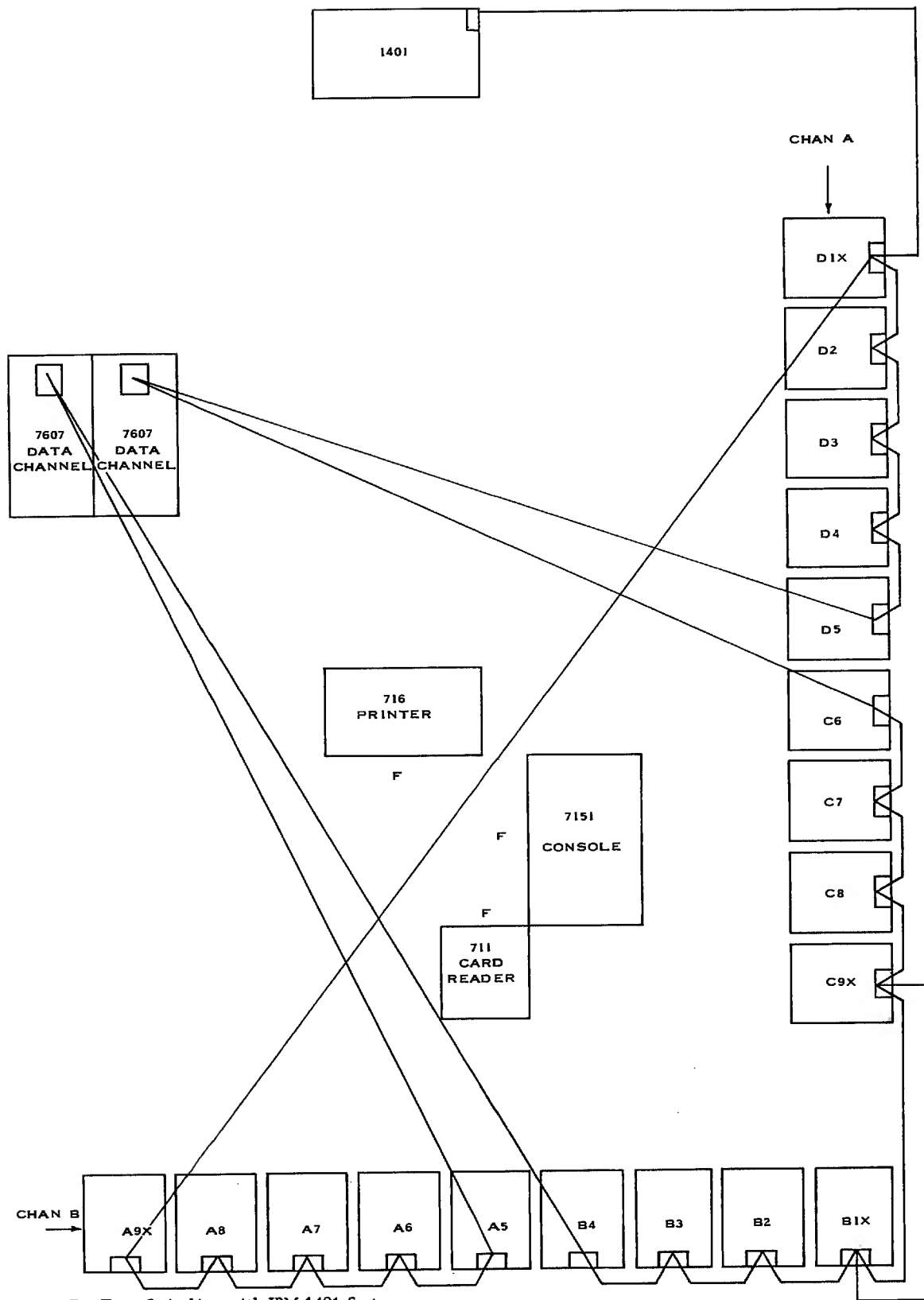


Figure 7. Tape Switching with IBM 1401 System

7090 AND 7094 SPECIFICATION SUMMARY

Type	Description	60 Cycle KVA	400 Cycle KVA	Total BTU/hr	CFM	Connector Type	Temp (Deg F)	RH (%)	Notes
7909	Data Channel	0.62	0.65	4000	500		65-90	10-80	I
7631	File Control	1.5		3550	500	A	65-90	10-80	
1301	Disk Storage	9.0		20000	Note	B	65-90	10-80	II, V
7640	Hypertape Control	1.6		4100	1000	E	60-80	20-60	VI
7340	Hypertape Drive	4.0		12000	700	B	60-80	20-60	IV, VI
7155	Switch Control Console	--	--	--	--	-	--	--	
1009	Data Transmission Unit	0.30		1000	120	C or D	60-90	20-80	III
1014	Inquiry Unit	0.35		1000	0	C or D	60-90	20-95	III
1011	Paper Tape Reader	1.8		4100	150	C	60-90	20-80	
1414-6	I-O Synchronizer	1.2		4050	1000	C	60-90	20-80	

Size	Voltage	Diameter (inches)	Min Bending Radius (inches)
60 amp, 3 phase, 4 wire	208/230	1.000	7.0
30 amp, 3 phase, 4 wire	208	.625	1.5
30 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	120	.375	1.5

Plug Connector	Receptacle	Size
A - Russell & Stoll FS3750	FS3933	250v, 30 amp, 1 phase, 3 wire
B - Russell & Stoll SC7328	SC7428	600v, 60 amp, 3 phase, 4 wire
C - Russell & Stoll FS3720	FS3913	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267	5262	125v, 15 amp, 1 phase, 3 wire
E - Russell & Stoll FS3760	FS3934	250v, 30 amp, 3 phase, 4 wire

NOTES:

- I. Powered from 7618.
- II. 1301 Disk Storage - This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
- III. Also available 120v, 1 phase, 3 wire for remote installation.
- IV. One Hypertape Drive out of each four requires power service from a customer-supplied receptacle.
- V. See Illustration Page for Airflow
- VI. The upper limits of the temperature and humidity specifications should not exist simultaneously for a period of more than 4 hours in any 48 hour period for either storage or operation.

Weights and Dimensions

<u>Type</u>	<u>Description</u>	<u>Wgt (lbs)</u>	<u>Dimensions (inches)</u>			<u>Service Clearances (inches)</u>				<u>Notes</u>
			<u>Front</u>	<u>Side</u>	<u>Hgt</u>	<u>Front</u>	<u>Rear</u>	<u>Left</u>	<u>Right</u>	
7909	Data Channel	700	38	32	70	42	36	30	30	I
7631	File Control	500	38	32	70	42	36	30	30	I
1301	Disk Storage	3,825	86	33	68-3/4	44	44	40	40	II
7640	Hypertape Control	1,100	74	32	70	42	36	30	30	I, III
7340	Hypertape Drive	1,500	29	60	48	46	52	--	--	IV
7155	Switch Control Console		7-1/2	12	8-1/2	--	--	--	--	
1009	Data Transmission Unit	500	29	30-3/4	39-3/4	42	42	30	30	
1011	Paper Tape Reader	529	31-3/4	24-1/8	60	30	42	30	30	
1014	Inquiry Unit	175	24	29	35	30	30	0	0	
1414-6	I-O Synchronizer	1,200	74	32	70	42	36	30	30	I, III

NOTES:

- I. A clearance of 30" is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
- II. Shipped in two sections, 50-1/8 and 35-3/8 inches long.
- III. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.
- IV. Minimum clearance for two 7340 units is 7 inches; clearances should alternate: 7", 22", 7", 22". Clearance between 7340 and any other unit or structure is 30 inches.

7080 SPECIFICATION SUMMARY

Type	Description	60 Cycle KVA	400 Cycle KVA	Total BTU/hr	CFM	Connector Type	Temp (Deg F.)	RH (%)	Notes
7908	Data Channel	.62	1.14	5800	500		65-80	10-80	I
7631	File Control	1.5		3550	500	A	65-90	10-80	
1301	Disk Storage	9.0		20000	Note	B	65-90	10-80	II, V
7640	Hypertape Control	1.6		4100	1000	E	60-80	20-60	VI
7340	Hypertape Drive	4.0		12000	700	B	60-80	20-60	IV, VI
7155	Switch Control Console	--	--	--	--	-	--	--	
1009	Data Transmission Unit	0.30		1000	120	C or D	60-90	20-80	III
1011	Paper Tape Reader	1.8		4100	150	C	60-90	20-80	
1014	Inquiry Unit	0.35		1000	0	C or D	60-90	20-95	III
1414-6	I-O Synchronizer	1.2		4050	1000	C	60-90	20-80	

Size	Voltage	Diameter (inches)	Min Bending Radius (inches)
60 amp, 3 phase, 4 wire	208/230	1.000	7.0
30 amp, 3 phase, 4 wire	208	.625	1.5
30 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	120	.375	1.5

Plug Connector	Receptacle	Size
A - Russell & Stoll FS3750	FS3933	250v, 30 amp, 1 phase, 3 wire
B - Russell & Stoll SC7328	SC7428	600v, 60 amp, 3 phase, 4 wire
C - Russell & Stoll FS3720	FS3913	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267	5262	125v, 15 amp, 1 phase, 3 wire
E - Russell & Stoll FS3760	FS3934	250v, 30 amp, 3 phase, 4 wire

NOTES:

- I. Powered from 7804.
- II. 1301 Disk Storage: This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
- III. Also available 120v, 1 phase, 3 wire for remote installation.
- IV. One Hypertape Drive out of each four required power service from a customer-supplied receptacle.
- V. See Illustration Page for Airflow.
- VI. The upper limits of the temperature and humidity specifications should not exist simultaneously for a period of more than 4 hours in any 48 hour period for either storage or operation.

Weights and Dimensions

Type	Description	Wgt (lbs)	Dimensions (inches)			Service Clearances (inches)				
			Front	Side	Hgt	Front	Rear	Left	Right	Notes
7908	Data Channel	500	38	32	70	42	36	30	30	I
7631	File Control	500	38	32	70	42	36	30	30	I
1301	Disk Storage	3,825	86	33	68-3/4	44	44	40	40	II
7640	Hypertape Control	1,100	74	32	70	42	36	30	30	I, III
7340	Hypertape Drive	1,500	29	60	48	46	52	--	--	IV
7155	Switch Control Console	--	7-1/2	12	8-1/2	--	--	--	--	
1009	Data Transmission Unit	500	29	30-3/4	39-3/4	42	42	30	30	
1011	Paper Tape Reader	529	31-3/4	24-1/8	60	30	42	30	30	
1014	Inquiry Unit	175	24	29	35	30	30	0	0	
1414-6	I-O Synchronizer	1,200	74	32	70	42	36	30	30	I, III

NOTES:

- I. A clearance of 30" is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
- II. Shipped in two sections, 50-1/8 and 35-3/8 inches long.
- III. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.
- IV. Minimum clearance for two 7340 units is 7 inches; clearances should alternate: 7", 22", 7", 22". Clearance between 7340 and any other unit or structure is 30 inches.

7074 SPECIFICATION SUMMARY

Type	Description	60 Cycle KVA	400 Cycle KVA	Total BTU/hr	CFM	Connector Type	Temp (Deg F.)	RH (%)	Notes
7907	Data Channel		2.25	7800	600		65-90	10-80	I
7631	File Control	1.5		3550	500	A	65-90	10-80	
1301	Disk Storage	9.0		20000	Note	B	65-90	10-80	II, V
7640	Hypertape Control	1.6		4100	1000	E	60-80	20-60	VI
7340	Hypertape Drive	4.0		12000	700	B	60-80	20-60	IV, VI
7155	Switch Control Console	--	--	--	--	-	--	--	
1009	Data Transmission Unit	0.30		1000	120	C or D	60-90	20-80	III
1011	Paper Tape Reader	1.80		4100	150	C	60-90	20-80	
1014	Inquiry Unit	0.35		1000	0	C or D	60-90	20-95	III
1414-6	I-O Synchronizer	1.2		4050	1000	C	60-90	20-80	

Size	Voltage	Diameter (inches)	Min Bending Radius (inches)
60 amp, 3 phase, 4 wire	208/230	1.000	7.0
30 amp, 3 phase, 4 wire	208	.625	1.5
30 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	120	.375	1.5

Plug Connector	Receptacle	Size
A - Russell & Stoll FS3750	FS3933	250v, 30 amp, 1 phase, 3 wire
B - Russell & Stoll SC7328	SC7428	600v, 60 amp, 3 phase, 4 wire
C - Russell & Stoll FS3720	FS3913	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267	5262	125v, 15 amp, 1 phase, 3 wire
E - Russell & Stoll FS3760	FS3934	250v, 30 amp, 3 phase, 4 wire

NOTES:

- I. Powered from 7802 through 7602.
- II. 1301 Disk Storage: This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
- III. Also available 120v, 1 phase, 3 wire for remote installation.
- IV. One Hypertape Drive out of each four requires power service from a customer-supplied receptacle.
- V. See Illustration Page for Airflow.
- VI. The upper limits of the temperature and humidity specifications should not exist simultaneously for a period of more than 4 hours in any 48 hour period for either storage or operation.

Weights and Dimensions

Type	Description	Wgt (lbs)	Dimensions (inches)			Service Clearances (inches)				Notes
			Front	Side	Hgt	Front	Rear	Left	Right	
7907	Data Channel	1,500	20	68	69	60	30	--	--	V, VI
7631	File Control	500	38	32	70	42	36	30	30	I
1301	Disk Storage	3,825	86	33	68-3/4	44	44	40	40	II
7640	Hypertape Control	1,100	74	32	70	42	36	30	30	I, III
7340	Hypertape Drive	1,500	29	60	48	46	52	--	--	IV
71SS	Switch Control Console	--	7-1/2	12	8-1/2	--	--	--	--	
1009	Data Transmission Unit	500	29	30-3/4	39-3/4	42	42	30	30	
1011	Paper Tape Reader	529	31-3/4	24-1/8	60	30	42	30	30	
1014	Inquiry Unit	175	24	29	35	30	30	0	0	
1414-6	I-O Synchronizer	1,200	74	32	70	42	36	30	30	I, III

NOTES:

- I. A clearance of 30" is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
- II. Shipped in two sections, 50-1/8 inches and 35-3/8 inches long.
- III. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.
- IV. Minimum clearance for two 7340 units is 7 inches; clearances should alternate: 7", 22", 7", 22". Clearance between 7340 and any other unit or structure is 30 inches.
- V. A 12-inch removable appendage is included in the side dimension.
- VI. A 30-inch clearance is required on any side not abutted.

7070 SYSTEM SPECIFICATION SUMMARY

Type	Description	60 Cycle KVA	400 Cycle KVA	Total BTU/hr	CFM	Connector Type	Temp (Deg F.)	RH (%)	Notes
7907	Data Channel		2.25	7800	600		65-90	10-80	I
7631	File Control	1.5		3550	500	A	65-90	10-80	
1301	Disk Storage	9.0		20000	Note	B	65-90	10-80	II, IV
7155	Switch Control Console	--	--	--	--	-	--	--	
1009	Data Transmission Unit	0.30		1000	120	C or D	60-90	20-80	III
1011	Paper Tape Reader	1.8		4100	150	C	60-90	20-80	
1014	Inquiry Unit	0.35		1000	0	C or D	60-90	20-95	III
1414-6	I-O Synchronizer	1.2		4050	1000	C	60-90	20-80	

<u>Size</u>	<u>Voltage</u>	<u>Diameter (inches)</u>	<u>Min Bending Radius (inches)</u>
60 amp, 3 phase, 4 wire	208/230	1.000	7.0
30 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	120	.375	1.5

<u>Plug Connector</u>	<u>Receptacle</u>	<u>Size</u>
A - Russell & Stoll FS3750	FS3933	250v, 30 amp, 1 phase, 3 wire
B - Russell & Stoll SC7328	SC7428	600v, 60 amp, 3 phase, 4 wire
C - Russell & Stoll FS3720	FS3913	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267	5262	125v, 15 amp, 1 phase, 3 wire

NOTES:

- I. Powered from 7802 through 7602.
- II. 1301 Disk Storage: This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
- III. Also available 120v, 1 phase, 3 wire for remote installation.
- IV. See Illustration Page for Airflow.

Weights and Dimensions

<u>Type</u>	<u>Description</u>	<u>Wgt (lbs)</u>	<u>Dimensions (inches)</u>			<u>Service Clearances (inches)</u>				<u>Notes</u>
			<u>Front</u>	<u>Side</u>	<u>Hgt</u>	<u>Front</u>	<u>Rear</u>	<u>Left</u>	<u>Right</u>	
7907	Data Chammel	1,500	20	68	69	60	30	--	--	III
7631	File Control	500	38	32	70	42	36	30	30	I
1301	Disk Storage	3,825	86	33	68-3/4	44	44	40	40	II
7155	Switch Control Console	--	7-1/2	12	8-1/2	--	--	--	--	
1009	Data Transmission Unit	500	29	30-3/4	39-3/4	42	42	30	30	
1011	Paper Tape Reader	529	31-3/4	24-1/8	60	30	42	30	30	
1014	Inquiry Unit	175	24	29	35	30	30	0	0	
1414-6	I-O Synchronizer	1,200	74	32	70	42	36	30	30	I, IV

NOTES:

- I. A clearance of 30" is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
- II. Shipped in two sections, 50-1/8 and 35-3/8 inches long.
- III. Must be abutted to the 7604 or 7301. A clearance of 30" is required on right side if not abutted to another unit. Side dimension includes a 12-inch removable appendage.
- VI. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.

1410 SPECIFICATION SUMMARY

Type	Description	60 Cycle KVA	Total BTU/hr	CFM	Connector Type	Temp (Deg F.)	RH (%)	Notes
7631	File Control	1.5	3550	500	A	65-90	10-80	
1301	Disk Storage	9.0	20000	Note	B	65-90	10-80	II, III
7155	Switch Control Console	--	--	--	--	--	--	
1009	Data Transmission Unit	0.3	1000	120	C or D	60-90	20-80	I
1011	Paper Tape Reader	1.8	4100	150	C	60-90	20-80	
1014	Inquiry Unit	0.35	1000	0	C or D	60-90	20-95	I
1414-5	I-O Synchronizer	1.2	4050	1000	--	60-90	20-80	

Size	Voltage	Diameter (inches)	Min Bending Radius (inches)
60 amp, 3 phase, 4 wire	208/230	1.000	7.0
30 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	120	.375	1.5

Plug Connector	Receptacle	Size
A - Russell & Stoll FS3750	F53933	250v, 30 amp, 1 phase, 3 wire
B - Russell & Stoll SC7328	SC7428	600v, 60 amp, 3 phase, 4 wire
C - Russell & Stoll F53720	FS3913	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267	5262	125v, 15 amp, 1 phase, 3 wire

NOTES:

- I. Also available 120v, 1 phase, 3 wire for remote locations.
- II. 1301 Disk Storage: This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
- III. See Illustration Page for Airflow.

Weights and Dimensions

<u>Type</u>	<u>Description</u>	<u>Wgt (lbs)</u>	<u>Dimensions (inches)</u>			<u>Service Clearances (inches)</u>				<u>Notes</u>
			<u>Front</u>	<u>Side</u>	<u>Hgt</u>	<u>Front</u>	<u>Rear</u>	<u>Left</u>	<u>Right</u>	
7631	File Control	500	38	32	70	42	36	30	30	I
1301	Disk Storage	3,825	86	33	68-3/4	44	44	40	40	II
7155	Switch Control Console	--	7-1/2	12	8-1/2	--	--	--	--	
1009	Data Transmission Unit	500	29	30-3/4	39-3/4	42	42	30	30	
1011	Paper Tape Reader	529	31-3/4	24-1/8	60	30	42	30	30	
1014	Inquiry Unit	175	24	29	35	30	30	0	0	
1414-5	I-O Synchronizer	1,200	74	32	70	42	36	30	30	I, III

NOTES:

- I. A clearance of 30" is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
- II. Shipped in two sections, 50-1/8 and 35-3/8 inches long.
- III. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.

7040/7044 SPECIFICATION SUMMARY

Type	Description	60 Cycle KVA	Total BTU/hr	CFM	Connector Type	Temp (Deg F.)	RH (%)	Notes
7904-1	Data Channel	1.6	3260	710	A	60-90	20-80	I
7904-2	Data Channel	2.6	6040	710	A	60-90	20-80	I
7631	File Control	1.5	3500	500	B	65-90	10-80	
1301	Disk Storage	9.0	20000	Note	A	65-90	10-80	III, V
7155	Switch Control Console	--	--	--	--	--	--	
1009	Data Transmission Unit	0.3	1000	120	C or D	60-90	20-80	IV
1011	Paper Tape Reader	1.8	4100	150	C	60-90	20-90	
1014	Inquiry Unit	0.35	1000	0	C or D	60-90	20-95	IV
1414-1, 2, 7	Tape Synchronizer	0.5	1400	500	--	60-90	20-80	II
1414-5	I-O Synchronizer	1.2	4050	1000	--	60-90	20-80	
1414-6	I-O Synchronizer	1.2	4050	1000	C	60-90	20-80	
729	Magnetic Tape	1.6	3900	550	--	60-90	20-80	I

Size	Voltage	Diameter (inches)	Min Bending Radius (inches)
60 amp, 3 phase, 4 wire	208/230	1.000	7.0
30 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	208/230	.500	1.5
15 amp, 1 phase, 3 wire	120	.375	1.5

Plug Connector	Receptacle	Size
A - Russell & Stoll SC7328	SC7428	600v, 60 amp, 3 phase, 4 wire
B - Russell & Stoll FS3750	FS3933	250v, 30 amp, 1 phase, 3 wire
C - Russell & Stoll FS3720	FS3913	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267	5262	125v, 15 amp, 1 phase, 3 wire

NOTES:

- I. 7904 is powered from the 7106/7107. The KVA of the tape units must be added to the data channel KVA for total KVA. A 60 ampere power cord is supplied with the 7904 when a tape channel is attached to the 7904. Maximum of 1 on the 7904-1 and maximum of 2 on the 7904-2. Each power cord will supply power for a maximum of 10 tape units.
- II. 1414-1, 2, 7 are powered from the 7106/7107.
- III. 1301 Disk Storage: This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground circuit should not exceed 3 ohms. For proper operation, all components of the system or systems to which the 1301 is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
- IV. Also available at 120v, 1 phase, 3 wire for remote installation.
- V. See Illustration Page for Airflow.

Weights and Dimensions

<u>Type</u>	<u>Description</u>	<u>Wgt (lbs)</u>	<u>Dimensions (inches)</u>			<u>Service Clearances (inches)</u>				<u>Notes</u>
			<u>Front</u>	<u>Side</u>	<u>Hgt</u>	<u>Front</u>	<u>Rear</u>	<u>Left</u>	<u>Right</u>	
7904-1	Data Channel	660	38	32	70	42	36	30	30	I
7904-2	Data Channel	750	38	32	70	42	36	30	30	I
7631	File Control	500	38	32	70	42	36	30	30	I
1301	Disk Storage	3,825	86	33	68-3/4	44	44	40	40	II
7155	Switch Control Console	--	7-1/2	12	8-1/2	--	--	--	--	
1009	Data Transmission Unit	500	29	30-3/4	39-3/4	42	42	30	30	
1011	Paper Tape Reader	529	31-3/4	24-1/8	60	30	42	30	30	
1014	Inquiry Unit	175	24	29	35	30	30	0	0	
1414-1, 2, 7	Tape Synchronizer	500	37-1/2	31-1/2	70	42	36	30	30	
1414-5, 6	I-O Synchronizer	1,200	74	32	70	42	36	30	30	I, IV
729	Tape Unit	1,600	29-1/8	33-7/8	69-1/4	30	30	2	2	III

NOTES:

- I. A clearance of 30" is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
- II. Shipped in two sections, 50-1/8 inches and 35-3/8 inches long.
- III. Suggested minimum clearance between tape units is 2 inches on a side, 30 inches between tape unit and any other unit.
- IV. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.

CABLES

IBM will supply the necessary cables for the initial installation as specified in the installation manual. The cables are custom-made to the lengths required for each installation. Cables are measured and ordered in accordance with the approved layout. The key number and suffix, if any, and part number along with the required cable length must be submitted for each cable in the computer system. All external cables are measured from the base of one machine to the base of the machine it connects. When computing the cable length required between units, measure from the center points of the cable hole locations in question. In the interest of best electrical design, all cable lengths should be kept as short as possible. Orders for cables that exceed the maximum lengths specified for the system must be accompanied by an approved RPQ.

External interconnecting cables should be installed under the false floor. Where a false floor is not used, these cables should be protected from mechanical injury, scuffing, and in a manner that will not present a safety hazard to operating personnel.

Cable orders must be placed with the plant from which the equipment was ordered. This cable order must be in the plant 120 days prior to machine delivery. Improperly placed orders will not be honored by the receiving plant.

* The signal transmitted over these wires will not cause interference with adjacent wires in a cable used for telephone transmission. Wire lines for the 1014 might be procured from a telephone company or common carrier, depending on availability of circuits and local policy on leasing wire facilities.

1014 Cables

1. The IBM 1014 can be installed either locally in the same room as the IBM Computer System, or can be installed remotely at a maximum distance of eight wire-miles* from the IBM 1414 Model 4, 5, or 6.

2. For local installation, IBM provides a 4-wire signal cable (approximately 3/8 inch diameter, 50 feet maximum length) for connecting the 1014 to the wall-mounted terminal box.

3. For remote installation, the customer provides the necessary wire in excess of 50 feet to connect the IBM 1014 to the wall-mounted terminal box.

4. The wall-mounted terminal box is connected to the 1414 Model 4, 5 or 6 (C frame) by up to 50 feet of cable.

5. Height of terminal boxes on the wall should be included in the X dimension of the 1014 cables.

Bending Radius of Cables

When cables are installed in a confined space, consideration should be given to the minimum bending radius of the cables to be installed: These radii are approximately as follows:

Outside Diameter (inches)	Min Bending Radius (inches)
1.5 - 1.0	7.0
1.0 - 0.75	3.0
0.75 - 0.1	1.5

Power Requirements

Unless otherwise noted, the specifications for voltage and frequency regulation are within the limits specified in the systems Installation Manual -- Physical Planning.

All Power cords supplied with equipment listed in this manual will be 14 feet long.

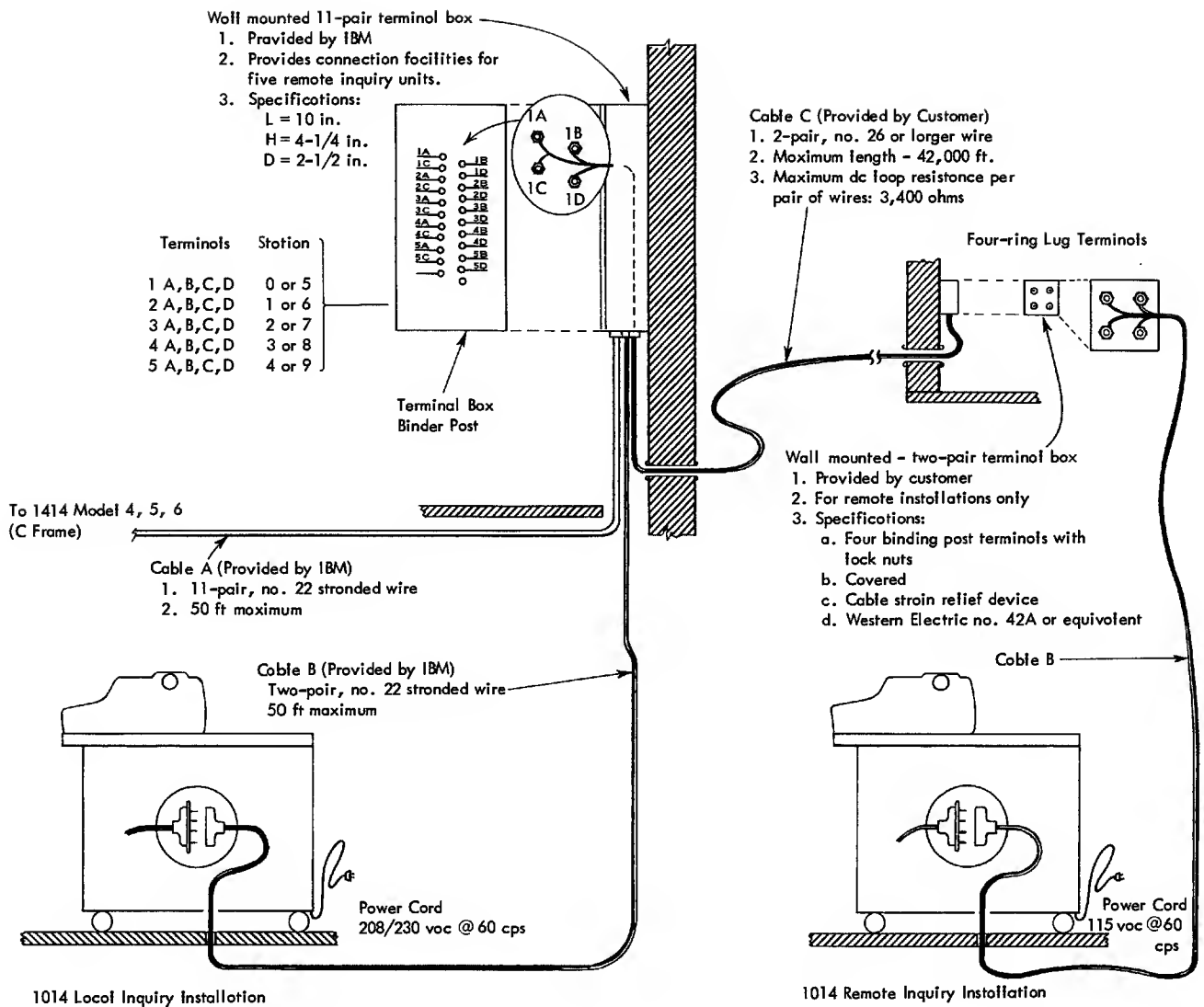


Figure 8. IBM 1014 Remote Inquiry Station Cable

I-O Components Cable Listing

Key No.	Type	P/N	From	Chan	To	Chan	Max Length (ft)	O. D. (in.)	Notes
400	Ctl	553379	7631		1301				I
401	Sgl	587387	7631		1301		150	.800	
411	Ctl	553379	1301		1301				II
412	Ctl	553379	1301		1301				II
413	Ctl	553379	1301		1301				II
414									
415									
416									
417									
451	Pwr	5312036	7340	A	7340	A	.745		III
453	Pwr	5312036	7340	B	7340	B	.745		III
455	Pwr	5312036	7340	A	7340	A	.745		III
457	Pwr	5312036	7340	B	7340	B	.745		III
459	Pwr	5312036	7340	A&B	7340	A&B	.745		III
460	Sgl	5311760	7340	A	7340	A	1.190		IV
461	Ctl	5312097	7340	A	7340	A	.405		IV
462	Sgl	5311332	7640	A	7340	A	1.190		IV
463	Ctl	5312097	7640	A	7340	A	.405		IV
470	Sgl	5311760	7340	8	7340	B	1.190		IV
471	Ctl	5312097	7340	8	7340	B	.405		IV
472	Sgl	5311332	7640	B	7340	B	1.190		IV
473	Ctl	5312097	7640	B	7340	B	.405		IV
499	Sgl	5311865	7340	A	7340	B	1.190		IV

NOTES:

- I, II. The sum of the lengths of the cable bearing Notes I and II shall not exceed 150 feet; i.e., Key No. 400 plus 411 plus 411a plus 411b plus 411c is equal to or less than 150 feet, or Key No. 400 plus 412 plus 412a plus 412b plus 412c is equal to or less than 150 feet.
- III. The total length of cable for any one Key No. bearing this note shall not exceed 86 feet.
- IV. The total length of signal cables on any one tape channel shall not exceed 130 feet for ten Hypertape units.

7090-7094 Cable Listing

Key No.	Type	P/N	From	Chan	To	Chan	Max Length (ft)	O. D. (in.)	Notes
404	Ctl	352303	7631		7909		100	.500	
409	Sgl	587330	7631		7909		50	.930	
468	Sgl	587330	7640	1	7909	1	25	.930	
469	Ctl	352303	7640		7909		100	.500	
478	Sgl	587330	7640	2	7909	2	25	.930	
60	Pwr	532542	7909		7618		100	.700	
61	Pwr	532973	7909		7618		100	.800	
62	Sgl	587314	7606		7909		.932		I
63	Sgl	531641	7606		7909		.932		I, II
66	Sgl	587314	7606		7909		.932		
67	Sgl	587314	7607		7909		.932		I
68	Sgl	531641	7607		7909		.932		I, II
69	Sgl	587314	7909		7607		.932		I
70	Sgl	531641	7909		7607		.932		I, II
71	Sgl	587314	7909		7909		.932		I
72	Sgl	531641	7909		7909		.932		I, II

NOTES:

- I. Total cable on any signal leg shall not exceed 100 feet. An additional cable, Key Nos. 15b, 68, 70 or 72, is required to join the outer ends of the signal legs. This cable may be up to 140 feet in length. A total of 340 feet of cable is available to install two 7607 or 7909 channels (one per signal leg) on a system. For each additional channel, decrease the total available cable by 40 feet.
- II. Use as required. This cable should connect the end channels of each signal leg. Not required if there is only one signal leg. To obtain maximum system efficiency, channels should be numbered in order of descending character rate and cabled in numeric sequence. Where several units have the same character rate, the application should determine the sequence number.

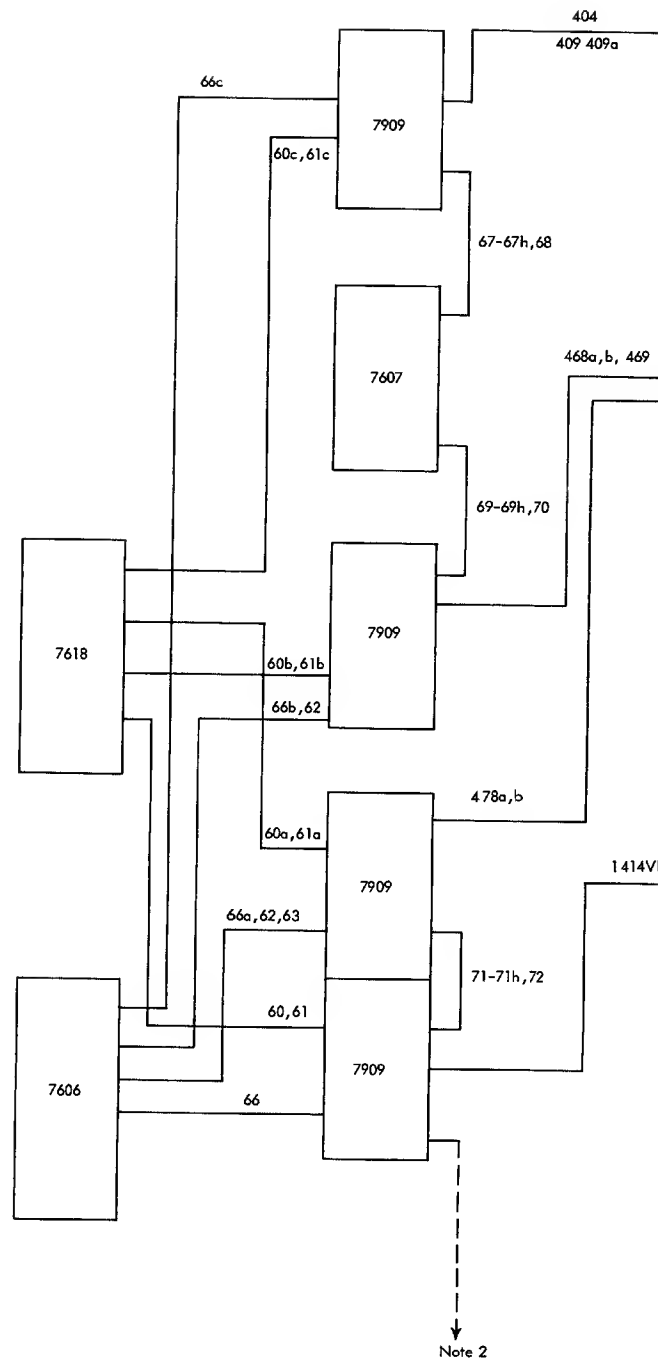


Figure 9. 7090-7094 Cabling Schematic

7080 Cable Listing

Key							Max	O. D.		Notes
No.	Type	P/N	From	Chan	To	Chan	Length (ft)	(in.)		
39	Pwr	352294	7908		7804		75	1.04	I	
40	Sgl	587387	7908		7102-1		35	.80		
41	Sgl	587387	7908		7102-2		35	.80		
42	Sgl	587387	7908		7305		35	.80		
43	Sgl	5305168	7908		7102-1		35	.80		
403	Ctl	352303	7631		7804		100	.50		
408	Sgl	587330	7631		7908		50	.93		
466	Sgl	587330	7640	A	7908		50	.93		
467	Ctl	352303	7640		7804		100	.50		
476	Sgl	587330	7640	B	7908		50	.93		

NOTES:
I. 7908 M5-9 only.

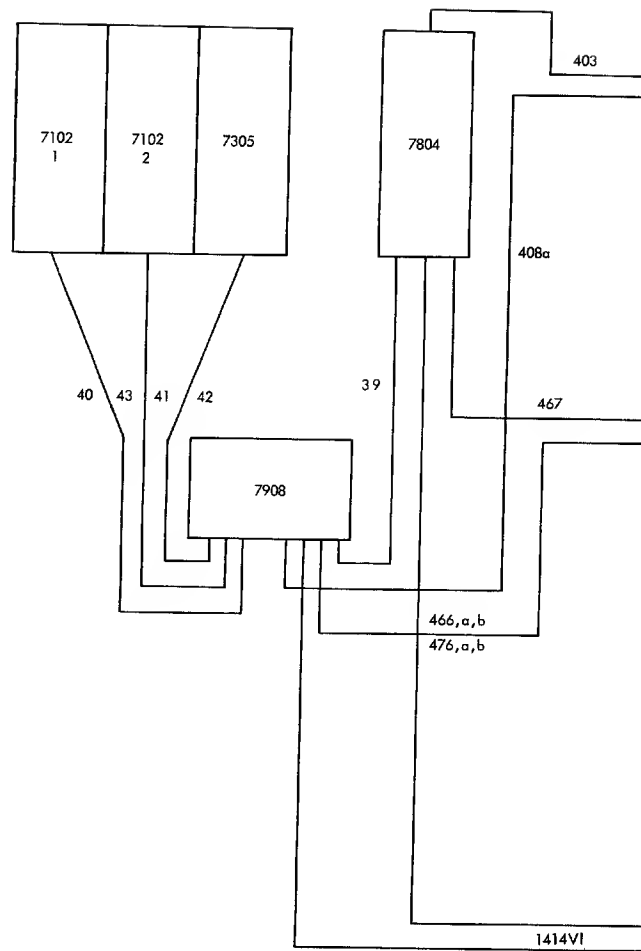


Figure 10. 7080 Cabling Schematic

7074 Cable Listing

Key								Max	O. D.	Notes
No.	Type	P/N	From	Chan	To	Chan	Length	(ft)	(in.)	
222	Pwr	539433	7602		7907		55		.800	
252	Sgl	587323	7104		7907		55		.830	
253	Sgl	587323	7104		7907		55		.830	
254	Sgl	587323	7104		7907		55		.830	
255	Sgl	587323	7104		7907		55		.830	
257	Sgl	592265	7301		7907		35		.932	
258	Sgl	592265	7301		7907		35		.932	
259	Sgl	592265	7301		7907		35		.932	
260	Bond	586877	7301		7907		35		.830	
402	Ctl	352303	7631		7602		100		.500	
407	Sgl	587330	7631		7907		55		.930	
464	Sgl	587330	7640	A	7907		55		.930	
465	Ctl	352303	7640		7602		100		.500	
474	Sgl	587330	7640	B	7907		55		.930	

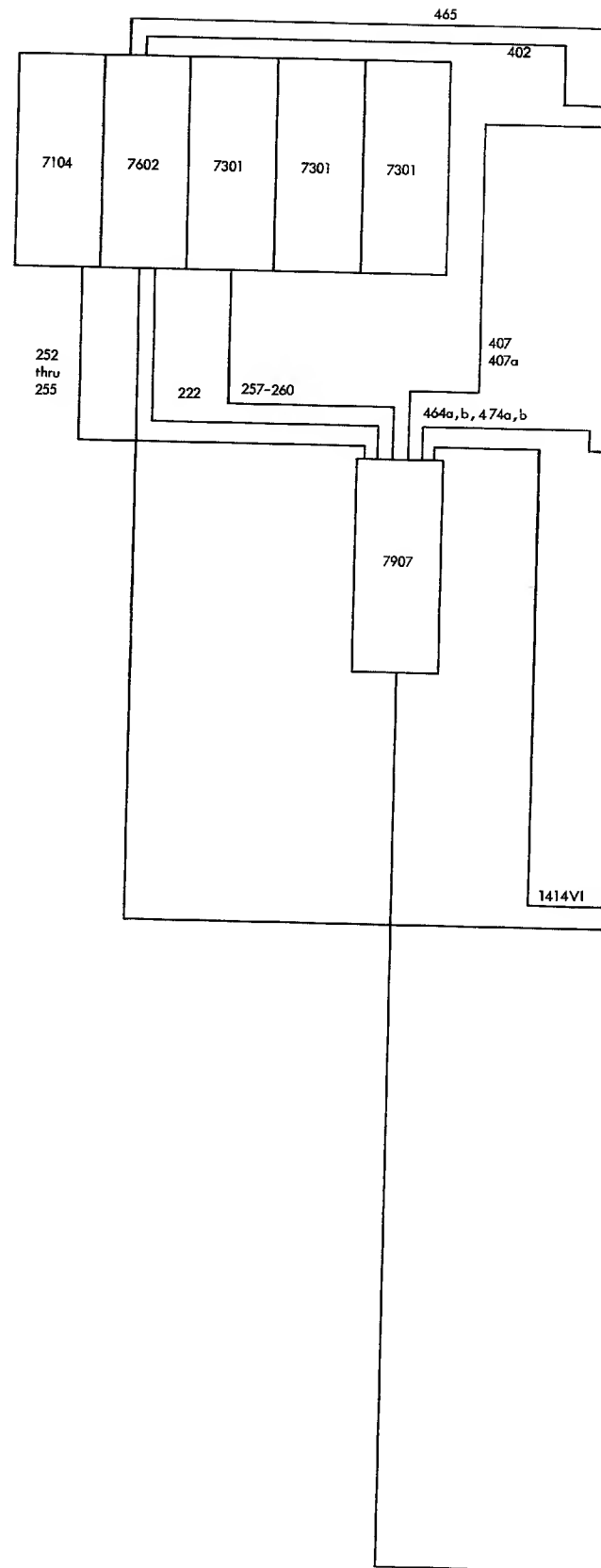


Figure 11. 7074 Cabling Schematic

7070 Cable Listing

Key					Max		Length O.D.		Notes
No.	Type	P/N	From	Chan	To	Chan	(ft)	(in.)	
402	Ctl	352303	7631		7602		100	.500	
407	Sgl	587330	7631		7907		55	.930	

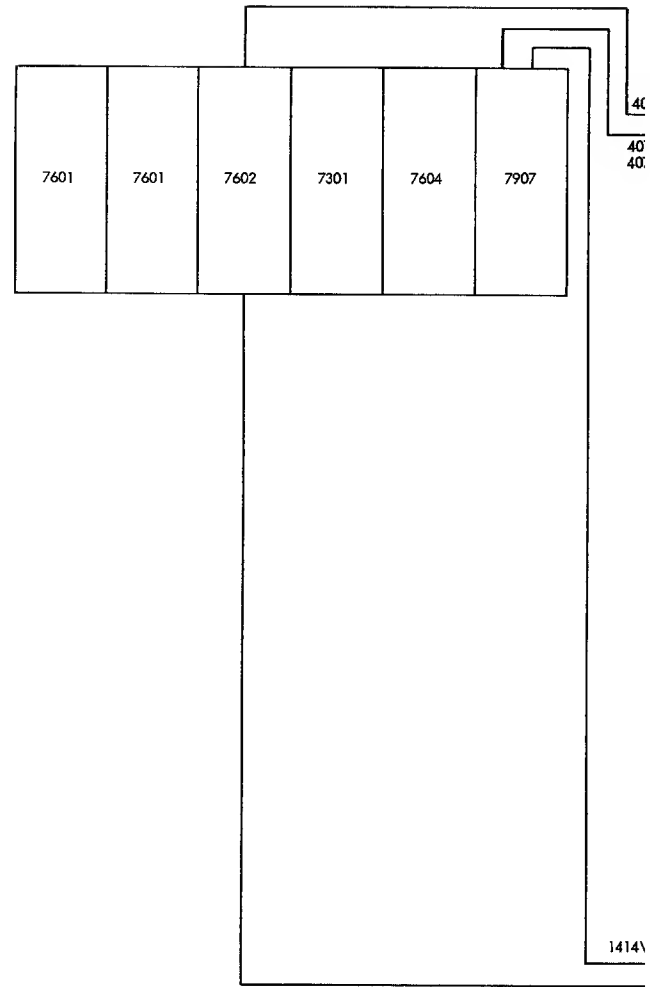


Figure 12. 7070 Cabling Schematic

1410 Cable Listing

Key						Max		O. D.		Notes
No.	Type	P/N	From	Chan	To	Chan	Length (ft)	(in.)		
405	Ctl	352303	7631		1411A		100	.500		
410	Sgl	553343	7631		1411D		50	.930		

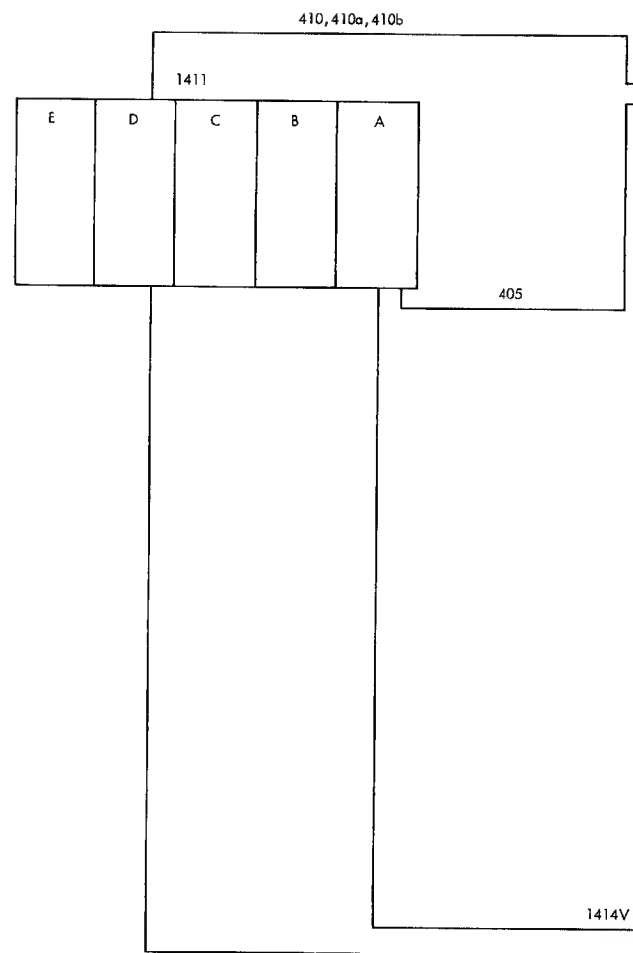


Figure 13. 1410 Cabling Schematic

ILLUSTRATIONS

Figures 16 through 24 are representative of cable connectors used in the computer systems. The dimensions given for the connectors are maximum over-all measurements and may be used in calculations concerning sub-floor clearances.

Figures 16 through 19 are input-output cables.

Figures 20 through 22 are interframe cables.

Figures 23 and 24 are power cables.

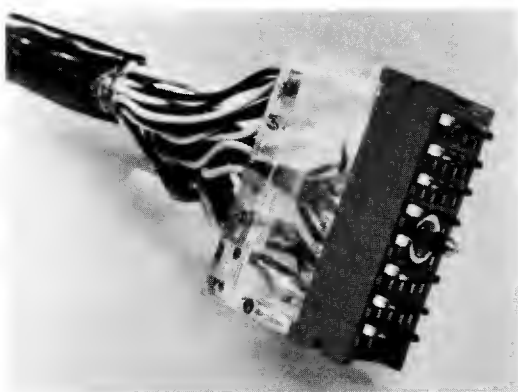


Figure 16. Disk Signal Cable Connector ($2\frac{3}{4}$ " high, $2\frac{1}{2}$ " deep, 1" wide)



Figure 17. Input-Output Signal Cable Connector ($7\frac{11}{16}$ " high, $3\frac{1}{2}$ " deep, $5\frac{15}{16}$ " wide)

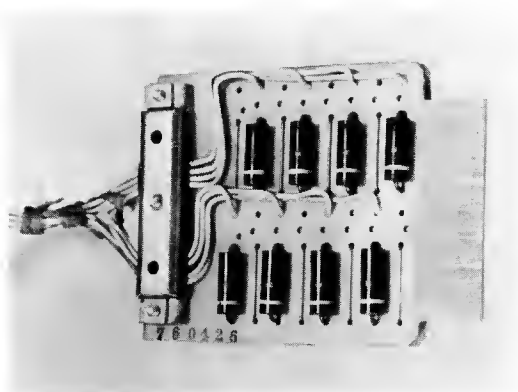


Figure 18. Paddle Connector ($2\frac{1}{2}$ " high, $4\frac{1}{2}$ " deep, $\frac{1}{2}$ " wide)

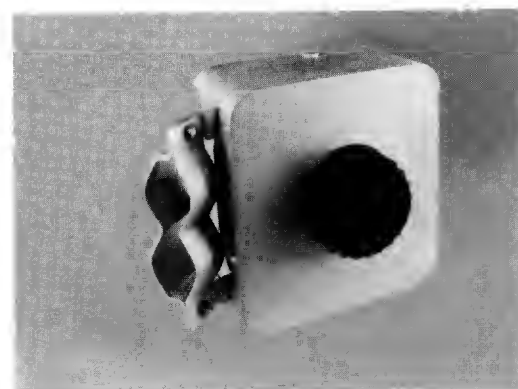


Figure 19. Hypertape Signal Connector ($7\frac{11}{16}$ " high, $4\frac{1}{8}$ " deep, $5\frac{15}{16}$ " wide)



Figure 20. Twenty-Position Connector (2" high, 2-13/16" deep, 2-3/8" wide)

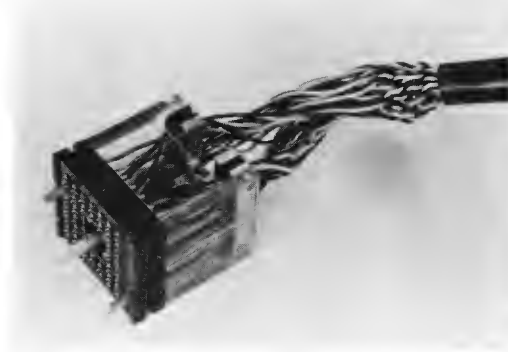


Figure 21. Forty-Position Connector (2" high, 2-1/2" deep, 2-3/8" wide)



Figure 22. Power Distribution Cable Connector (O.D. 2-1/2", 3-1/8" long)



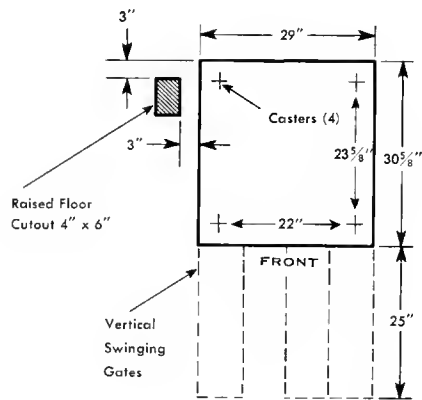
Figure 23. Power Cord Connector (3Φ, 60 amp, 4 wire; O.D. 3-3/4", 9" long)



Figure 24. Power Cord Connector (3Φ, 30 amp, 4 wire; O.D. 2-1/4", 4-1/2" long)

1009 DATA TRANSMISSION UNIT

Plan View



Notes

Height: 39-5/8"

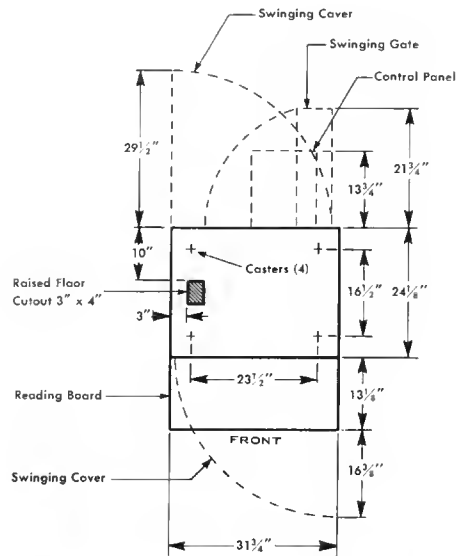
Service Clearances: Front Rear Sides
42" 42" 30"

Should be located near system console.



1011 PAPER TAPE READER

Plan View



Notes

Height: 60"

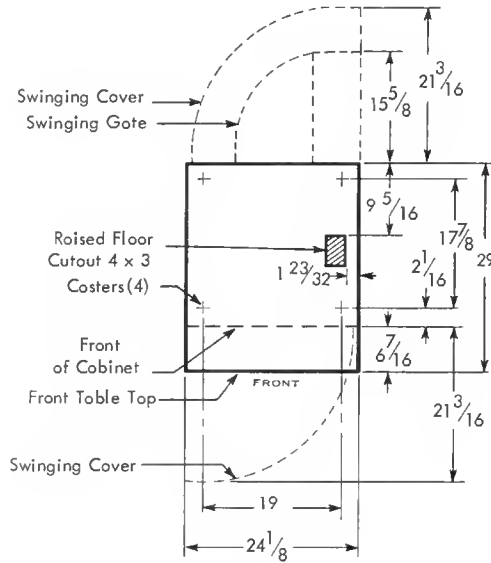
Service Clearances: Front Rear Sides
30" 42" 30"

Front clearance is measured from front of reading board.



1014 REMOTE INQUIRY STATION

Plan View



Notes

Height: 35"

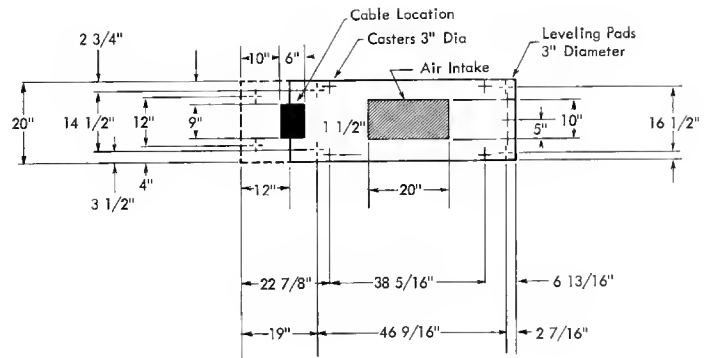
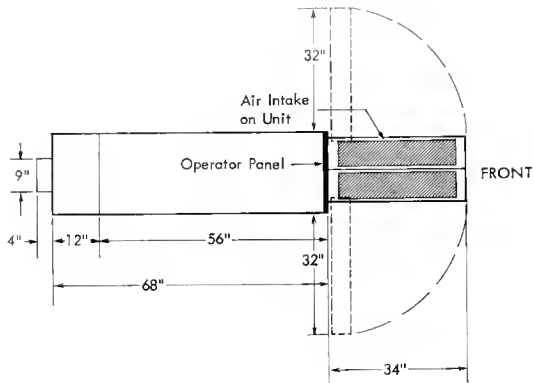
Service Clearances: Front Rear
30" 30"

None required for sides.



7907 DATA CHANNEL

Plan View



Notes

Height: 69"

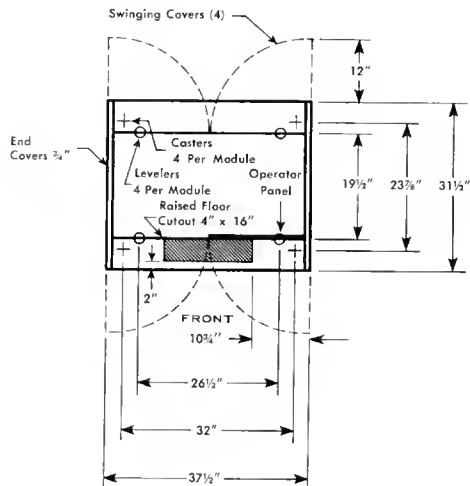
Service Clearances:

- 30" Rear
- 60" Front
- 30" On exposed side

May be abutted to units of similar construction.

1414 INPUT-OUTPUT SYNCHRONIZER, MODELS 1, 2, 3, and 7
7904, 7908, 7909 DATA CHANNELS

Plan View

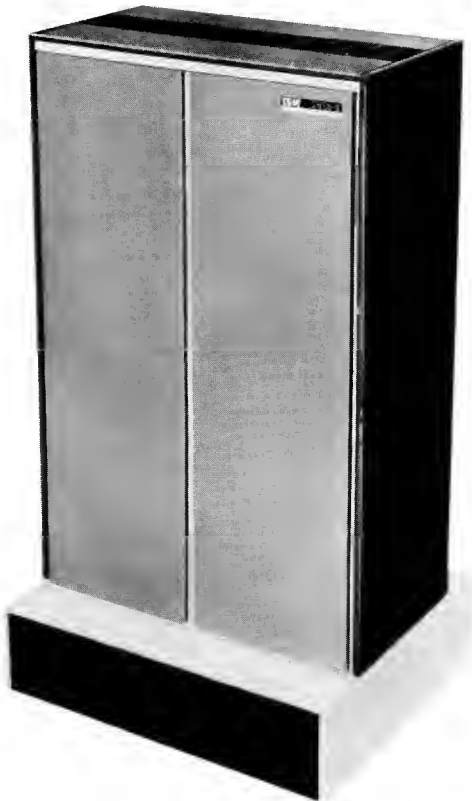


Notes

Height: 70"

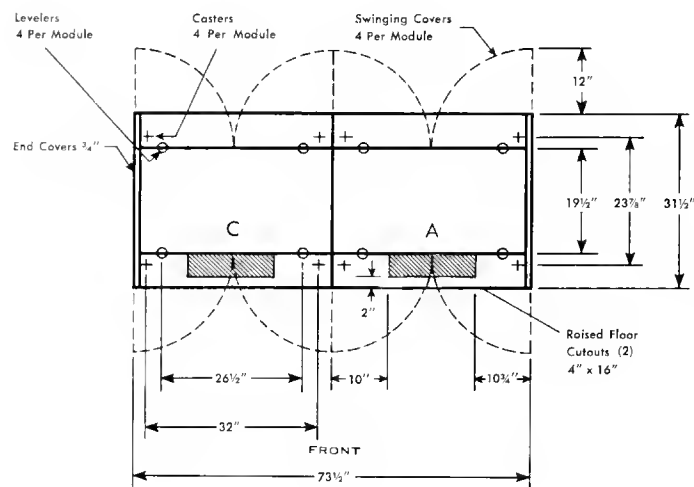
Service Clearances: Front Rear Sides
42" 36" 30"

Units may be placed in a line to form assemblies of up to 5 modules.



1414 INPUT-OUTPUT SYNCHRONIZER, MODEL 4, 5, and 6

Plan View



Notes

Height: 70"

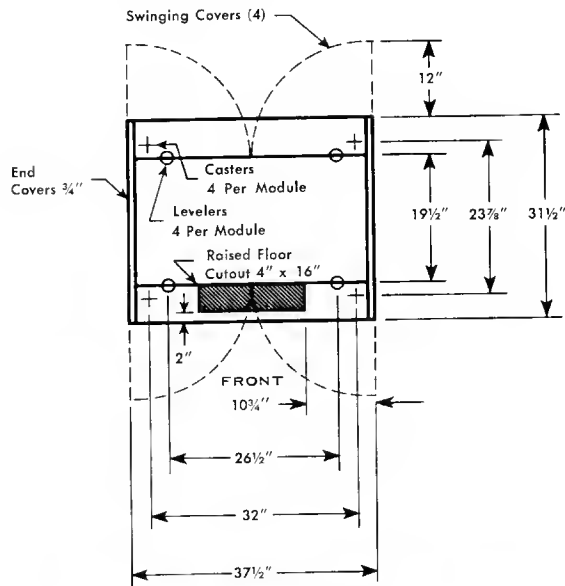
Service Clearances: Front Rear Sides
42" 36" 30"

Units may be placed in a line to form
assemblies of up to 5 modules.



7631 FILE CONTROL ALL MODELS

Plan View



Notes

Height: 70"

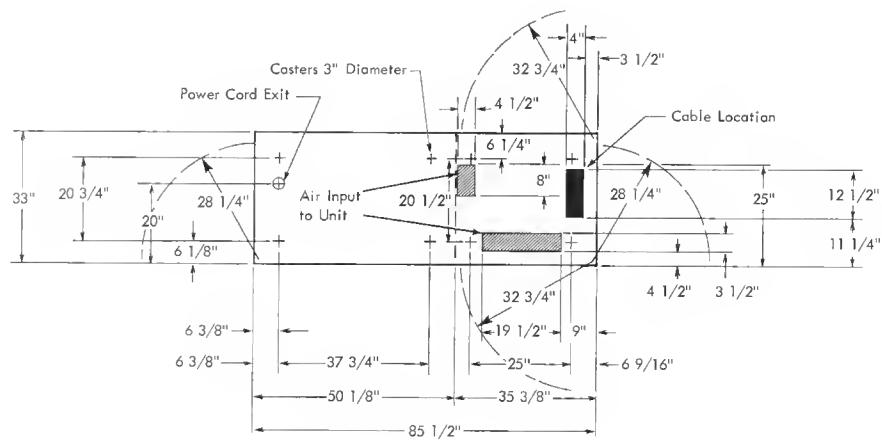
Service Clearances: 30" each side
42" front
36" rear

Similar units may be abutted.
Limit assemblies of units to 5 modules.



1301 DISK STORAGE

Plan View

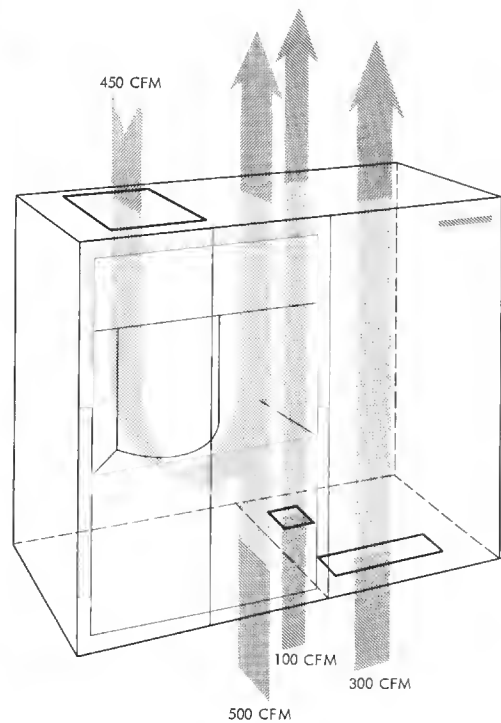
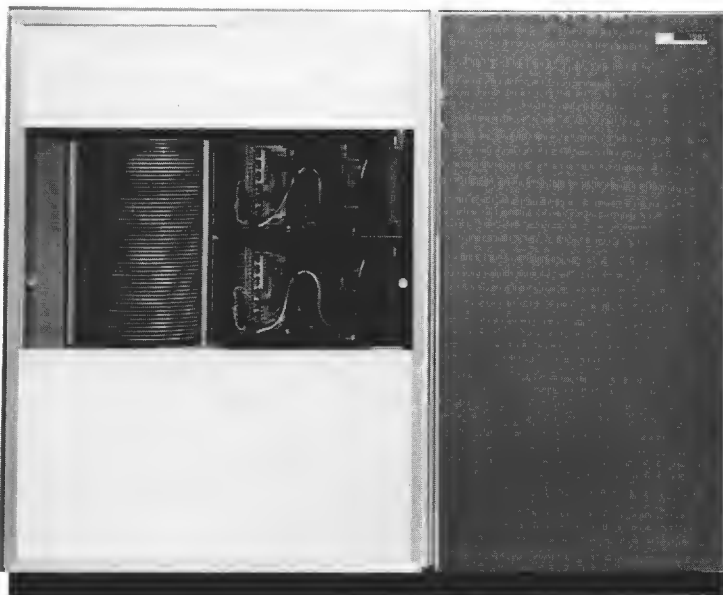


Notes

Height: 68-3/4"

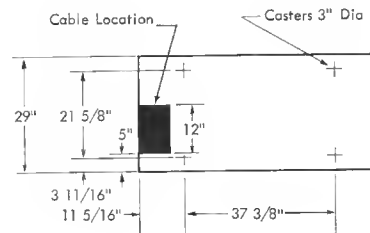
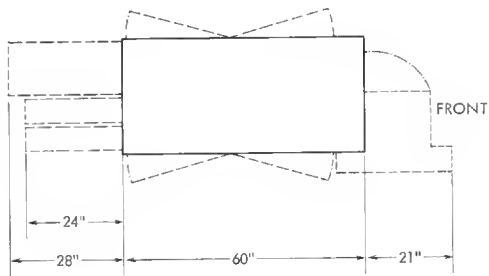
Service Clearances:
44" Front and Rear
40" Sides

Air Flow



7340 HYPERTAPE DRIVE

Plan View



Notes

Height: 48"

Service Clearances:

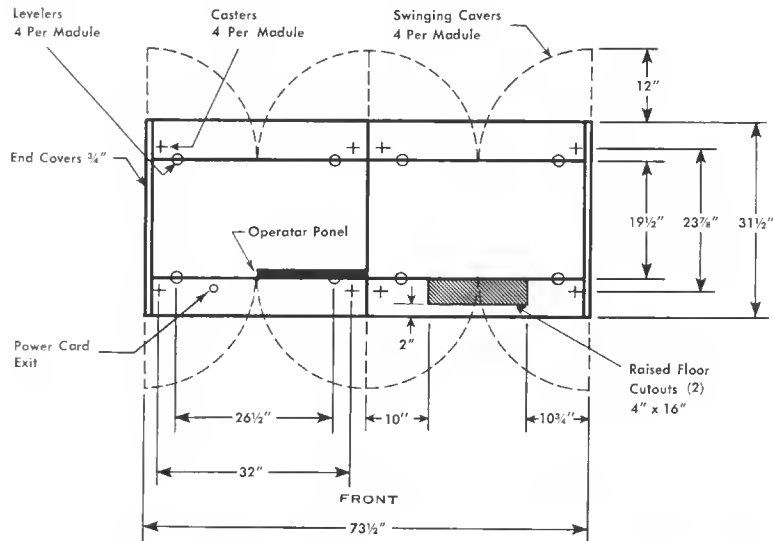
Sides 7" One Side
22" Other Side

Front 46"

Rear 52"

Air intakes and exhaust on sides.

Plan View



Notes

Height: 70"

Service Clearances:

42" Front

36" Rear

30'' On Ends

May be abutted to other units of similar construction. Limit assemblies to 5 modules.



late
7/62: 5M-VO-56



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